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ABSTRACT

In 1993 the National Science Foundation approved the funding of a 5-year program to enhance science education within a large school district in the southern United States. The initial grant funded training for 34 mentors and identified 7 primary goals and 31 activities toward those goals. During the project, two teachers in each elementary school were trained as science mentors, who are to diffuse the proposed innovations throughout the school district. This report is part of a multi-year, multi-phase evaluation in its formative stage. The science mentors and five science specialists completed a questionnaire about the program and the communication between the mentors and specialists. From the responses of the teachers, the evaluation team suggests the following recommendations: (1) appointment of a program director; (2) improving district support through promotion and publicity; and (3) amending the scheduling and content of monthly meetings to meet teacher needs more closely. (Contains 6 references.) (SLD)

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Interviewing Process and Findings: Evaluation of a First Year Science Improvement Project

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Program Background

In the spring of 1993, the National Science Foundation approved the funding of a $1.7 million, five-year program for a large school district in the southern United States. The primary goal of the program is to enhance science education within the elementary schools of the district.

Lawrenz (1986) has described a growing concern regarding the shortage of qualified science teachers across the United States and has suggested that current teachers will be called upon to fill the gaps in instructional delivery. As a result, appropriate enrichment programs need to be developed that will assist current classroom teachers in strengthening their science knowledge base and increasing their confidence in performing science demonstrations.

The National Science Foundation has recently increased its interest in programs that train model teachers to assist in training other teachers, rather than depending solely on university science educators (Rowland and Stuessy, 1990). The use of mentor teachers is also being encouraged by other funding agencies.

While describing a similar program in another state, Rowland and Stuessy (1990) provide almost a mirror image of the model used in the program described by this report. They identify the use of kits in the training process, the progression of process definitions and lesson objectives introduced by a specialist to actual instruction followed by activities and a final discussion of other appropriate activities during training sessions, and the use of children in demonstration sessions to identify activities

required to complete the process skill. Workshop instruction provided by peers was also identified as being very positive.

While each of these elements were initially used in the teaching of teachers, they would be equally appropriate strategies for use in teaching children.

In reviewing another related program component, Reiman and Thies-Sprinthall (1993) stress the importance of guided reflection in the cognitive development of individuals. The program examined by this report placed a special emphasis on both oral and written reflection during training sessions and in conducting classroom lessons with children.

During the five years of this project, two teachers in each elementary school will be trained as science mentors. These teachers will receive instruction in physical science content, training in how to manage a hand-on, activity -based science program, and training in the use of alternative assessment methods.

The grant calls for the gradual diffusion of the proposed innovations in the teaching of science throughout the school district. Initial funding provided for the training of 34 science mentors beginning in the summer of 1993 and continuing through the 1993-94 school year. These science mentors will be expected to work with science teachers in all of the elementary schools within the district.

Program Goals

The initial grant proposal identified seven primary goals and 31 activities designed to assist in meeting the goals.

Teacher Goal 1. To increase the teacher's knowledge of physical science content.

Teacher Goal 2. To train teachers in managing and directing a hands-on, activity-based science program.

Teacher Goal 3. To train teachers in the use of alternative assessment methods.

Teacher Goal 4. To develop a network of science mentors that provides collegial support and leadership both to the mentors and other teachers in each school.

Teacher Goal 5. To develop a shared vision for the science program among parents and the community that ultimately supports the continuance of the program.

Student Goal 1. To develop students' understanding of the habits of the mind identified in Science for All Americans (Rutherford and Ahlgren, 1990).

Student Goal 2. To develop students' understanding of the basic concepts of the nine topics outlined in the program.

Activities during the first program year, 1993-94, placed an emphasis on staff development and the attainment of teacher goals. As a result, neither of the student goals were directly assessed.

Methodology

This report is only one part of a multi-phase, multi-year evaluation which is currently in the formative stage. During program years three through five, the evaluation will become more summative. Pattons's sense of triangulation (1990) has been used throughout each evaluation activity. Multiple observers, through observations, interviews, and document analysis gathered the data

used in the overall evaluation. This report will only focus on the interview process.

A questionnaire was developed by the evaluation team and the program staff for use with all 34 science mentor teachers. A modified version was also used with the five science specialists. The instrument contains a combination of closed and open-ended questions. The closed items were analyzed statistically and this report will provide analysis of the open items.

These items were asked in a structured interview format with a member of the evaluation team interacting one-on-one with each mentor teacher. The evaluation team member who conducted the interview was the same individual who had observed in that teacher's classroom during the 1993-94 school year.

The open-ended items included the following:

* Three items concerning the goals of the program.
* Three items concerning the collaboration and/or communication that had occurred between the science mentor and the specialists.
* One question about why the mentor had decided to participate in the program.
* Four questions about performance-based assessment.
* Two questions regarding strengths and weaknesses of the program during the 1993-94 school year.
* One question seeking suggestions for improving the program.
* One question examining interest in the program expressed by other faculty members within the mentor's school.
* One question regarding their intention to participate during the following year.

* One question regarding their perception of support within their own school.

These data were analyzed using the constant comparative technique (Lincoln and Guba, 1985).

Results

This section will compare responses from the mentor teachers (teachers) with responses from the program staff (staff).

When asked about the goals of the program, 22 of the teachers stated that they definitely were aware of them and the three most frequent responses were three of the four formally stated goals of the program for the first year. Staff members articulated the program goals more specifically, but there was general agreement between the teachers and the staff.

Twenty-eight teachers felt they were in full agreement with the staff regarding program goals, while the staff expressed doubt that the teachers had fully understood the goals.

Regarding collaboration and communication, teachers were evenly distributed across the responses from very much to very little. Some of the staff members felt there had been adequate interaction, while others felt there had been little interaction of these types. While teachers expressed a sense of little actual team teaching, they were not disappointed and felt that interaction during lessons was about right. Very little interaction occurred after lessons because of scheduling demands on the parts of both teachers and staff members.

Most teachers stated that their participation in the program was a result of their own interest in science or their desire to

broaden their educational experiences. A few stated that they had actually been volunteered by their principals and had little knowledge about the program before it began. Staff members also identified their keen interest in science and most felt they had been selected because of their personal expertise.

Most teachers felt they had made a good effort to utilize performance-based assessments during the year, although they also expressed concerns over the amount of time required, the lack of assigned letter grades, and the lack of ready to use instruments or checklists. Staff members expressed this same optimism regarding attempts, but also acknowledged the need for more training in this area.

Teachers expressed keen interest in pursuing performance-based assessments, wanted more assistance in the formulation of activities, and stressed the benefit to students of the approach. Staff members commended teachers for their efforts and expressed consistent opinions that the process would continue and would improve over time. The greatest problem areas for teachers included time involved and the lack of useable instruments. The staff appeared to agree that the major obstacle to performance based assessment was the teachers' lack of familiarity with the process.

According to teachers, the strengths of the program included assistance from the specialists and the use of kits as instructional tools. Accomplishing the stated goals was the main strength identified by staff members. The use of kits and opening the science resource center were also mentioned.

The greatest weakness of the program to teachers was the monthly inservice/meeting schedule. Teachers requested less of them, shorter sessions, and/or more interesting presenters. Staff members were concerned that a few teachers in the program had entered with extremely low science content knowledge. This created training problems and clouded the attempt to identify this group as some of the best teachers in the system. Staff members also mentioned a lack of communication at times among themselves and a lack of support from the central office. They felt they were on their own with no actual support base.

Suggested improvements for the following year from teachers included more opportunities to share/communicate with teachers from other schools; schedules were so full that meeting times did not allow for informal interaction. Another suggestion was to schedule meetings and classroom presentations with more flexibility and teacher input. Apparently, the teachers felt that all scheduling decisions had been made by the staff without their input. Staff members requested the designation of one person as Project Director and more active support from the central office. The staff members were keenly aware of teacher suggestions and expressed their intent to listen and modify meetings and schedules as much as possible to accommodate teacher concerns.

Teachers and staff all plan to participate in the following year, with the exception of two teachers who expect to be changing grade levels, one teacher who is leaving the district, and one teacher who is leaving the program for personal reasons.

Finally, several teachers expressed concern that they were not supposed to share kit materials with other teachers in their schools. This policy had created some ill feelings and resentment in a few cases. In one school, the principal was withdrawing support from two teachers because they were absent from the building so often for program meetings.

Conclusion

The following preliminary recommendations are made and have already been expressed to a certain degree by the program staff. This program is strengthened by the high quality of its participating teachers and staff members who have a desire to listen and work to make necessary improvements.

* A Program Director should be appointed.

* Staff members and participants should enlist more district support by promoting the program, making it more visible, and publicizing the work and progress that has occurred in just one year.

* Lines of communication must remain open, both within the program staff and between the staff and teachers.

* Examine the scheduling and content of monthly meetings and modify to more closely meet teacher needs.

More specific recommendations will be articulated as this evaluation comes together into a whole product. The vast amounts of data and the varying aspects of this program have made a complete evaluation both complicated and lengthy. The program staff has been extremely cooperative throughout this process and

the commitment of this project to detailed, ongoing evaluation is to be commended.

Continuation

Other evaluable components of this program include the 1993 summer institute, the complete 1993-94 school year program (includes classroom observations, resource center observations, observations of assessment workshops, closed responses of mentor teachers, closed responses of specialists, mentor evaluations of monthly meetings, and results of parent surveys), the 1994 summer institute, the complete 1994-95 school year program, and subsequent components through the end of the program grant (currently summer of 1998). Beginning in the third project year, student goals will also be assessed.

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